REMARKS

The Office Action was mailed in the present case on March 25, 2002, making a response due by June 25, 2002. A Petition For Extension of Time Within the Second Month and the required extension fee are enclosed. No additional fee is thought to be due at this time. If any additional fee is due for the continued prosecution of this application, please charge the same to Applicant's Deposit Account No. 50-0259 (Bracewell & Patterson, LLP).

Applicant's invention is an alternative method for producing a "belled" end of a thermoplastic pipe wherein the belled end is provided with an internal, gasket receiving groove and a gasket pre-fitted within the groove. As pointed out in Applicant's background discussion, a number of techniques have been devised to retain sealing gaskets within an internal gasket receiving groove provided within the belled end of a female pipe section as the female pipe section is joined to a male, or spigot pipe section. The tendency is for the gasket to be turned or twisted or to be dislodged from the gasket receiving groove.

One answer to this problem was the "Rieber" system described in Applicant's background. The Rieber system employed a combined mould element and sealing ring for sealing a joint between the socket end and spigot end of two cooperating pipes formed from thermoplastic materials. In the Rieber process, the elastomeric gasket was inserted within an internal groove in the socket end of the female pipe as the female pipe end was simultaneously being formed. The provision of a prestressed and anchored elastomeric gasket during the belling process at the pipe factory provided an improved socket end for a pipe joint with a sealing gasket which would not twist or flip or otherwise allow impurities to enter the sealing zones of the joint. However, in the Rieber system, the female preformed pipe was heated and the pipe end physically forced over a mandrel which held the gasket. Thus, it was necessary to force the pipe end over the gasket and mandrel and to move the pipe end longitudinally over the gasket so that the gasket was seated. This could only be accomplished by heating the thermoplastic material to allow its expansion, followed by cooling to

return the material to its natural, relaxed state.

Certain of the polyolefin materials were not well adapted for use in the Rieber-type process. Polyethylene pipe, for example, after being heated has a tendency to return to its original shape. Thus, after a bell connection is formed using the traditional Rieber techniques of heating, forming/expanding and cooling, the end result is a pipe shape that is not stable.

The presently described invention takes a different approach to the problem of locating a sealing gasket within the belled pipe end of a thermoplastic pipe, wherein the gasket is securely retained against the tendency to twist, turn or be dislodged during subsequent pipe joint assembly. The pipe couplings of the invention have a stable shape upon cooling. The method of the invention provides an integral gasket within the socket end of a polyethylene pipe which is securely retained within a receiving groove which is integrally formed about the gasket during the manufacturing step. Applicant's technique is especially well adapted to the manufacture of very large diameter gasketed pipe at a lower cost that traditional methods.

The Examiner has rejected Applicant's Claims 1-3 under 35 U.S.C. Section 112 in that the body of the claims describe only the method of forming a gasket and not of forming a socket end of a thermoplastic pipe. Claims 1-3 have been cancelled, thus mooting this ground of rejection. The remaining claims are thought to more clearly define the method steps in forming the integral gasket and bell connection, as a whole.

The Examiner also rejected Applicant's Claims 1-11 under 35 U.S.C. Section 103 (a) as being obvious over Sznopek (4,329,193) in view of Sundqvist et al. (5,411,619). Sznopek is cited to show the steps of installing an elastomeric gasket on a mandrel and extruding a composite material including a thermosetting plastic. Since the composite material of Sznopek is not a thermoplastic material, the Examiner then cites Sundqvist to show the extrusion of a thermoplastic profile.

Significantly, the Examiner states that while Sundqvist fails to specifically teach polyethlene, that such teaching is a mere matter of design choice "wherein no stated problem is solved or any new or unusual result is achieved" (Office Action of March 25, 2002, page 3). However, as discussed above, the polyethylene material under consideration is a key factor in the utility of the present method of manufacture. Polyethylene pipe, when heated and stretched about a forming mandrel (as in the Rieber process) has a tendency to return to its original shape. Thus, after a bell connection is formed using the traditional Rieber techniques of heating, forming/expanding and cooling, the end result is a pipe shape that is not stable. Applicant's manufacturing technique overcomes this deficiency in the Rieber process by spirally wrapping the outer pipe material about the pre-located gasket on the forming mandrel.

Note that Applicant's independent claims have been amended to call for "polyethylene" materials. Also, the end result is described as being "a pre-stressed and pre-located integral gasket" provided within the socket end of a polyethylene pipe which is securely retained within a receiving groove which is integrally formed about the gasket during the manufacturing step." The gasket is "pre-located" because it is already present in the gasket receiving groove when the bell pipe end is formed. It can also be "pre-stressed", as by stretching the gasket about the forming mandrel before extruding the polyethylene material about the mandrel. All of these factors provide a gasket sealing system which achieves the same objectives as the previous Rieber process, but without the disadvantage of having to stretch a preformed polyethylene pipe end over a forming mandrel.

Still want to put it on a poss point

Sznopek shows the use of a rubber sleeve in interconnecting sections of essentially rigid asbestos-cement pipe (Col. 1, lines12-13). As such, he is not concerned with the expansion and contraction characteristics of polyethylene pipe. Further, in Sznopek, the thermoplastic material is provided in the form of an elastomeric sleeve 12 which is surrounded by a fiber glass (reinforced) plastic body 10. The elastomeric sleeve 12 is cut from a continuous extrusion of EPDM rubber (Col. 5, lines 44-46). The cut section of extrusion is spliced to an annular configuration (Col.5, line 48). The spliced liner is then installed on a rotatable mold (Col. 6, lines 23-24). A polyester body is then built up upon the elastomeric liner (see Col. 7, lines 19-25).

The Sundqvist reference does deal with spirally wrapping thermoplastic materials, but the pipe joint which is formed does not have an "integral gasket" which is provided within the socket end of a polyethylene pipe which is securely retained within a receiving groove which is integrally formed about the gasket during the manufacturing step, as claimed by Applicant. Thus, the teaching of Sundqvist is not directed toward an alternative to the Rieber pre-formed and pre-stressed sealing gasket system. The melt thermoplast in Sundqvist is extruded and spirally wrapped in overlapping layers "around the mandrel and the pipe end" (Abstract of Sundqvist). Applicant is not wrapping a thermoplast melt "about a pipe end." Applicant is, more precisely stated, forming a pipe end.

In summary, Sznopek stretches a rubber "sleeve" about a mandrel. A polyester body is then built up upon the sleeve by rotating the mandrel while a polyester hardener system is applied. If the teaching of Sznopek and Sundqvist were combined for some reason, one would be taught to stretch a rubber liner over a mandrel and then apply a polyester hardener system in a helical spiral as the mandrel was rotated. This would in no way arrive at Applicant's claimed method of providing an integral gasket within the socket end of a polyethylene pipe which is securely retained within a receiving groove which is integrally formed about the gasket during the manufacturing step.

Based upon the above remarks, Claims 4, 5 and 7-11 are thought to be allowable over the art of record and an early notification of the same would be appreciated.

Respectfully submitted,

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Amended Claims With Underlining and Brackets:

4. (Once amended) A method of manufacturing an [integrated bell connection] for a joint of [thermoplastic] polyethylene pipe, the method comprising the steps of:

providing a rotatably driven mandrel having a substantially cylindrical end section corresponding to the internal diameter of a bell connection to be formed, the mandrel having an outer extent and an inner extent, the mandrel having a locating area for an elastomeric gasket on an external surface thereof;

positioning an elastomeric gasket on the external surface of the mandrel at the locating area thereof, the locating area being between the inner and outer extents of the mandrel;

forming a bell connection about the mandrel and suitably located gasket by extruding a melt profile made of [thermoplastic material] polyethylene onto the mandrel beginning adjacent the inner extent of the mandrel and spirally winding the melt profile around the cylindrical end section of the mandrel and around the gasket such that adjacent windings of the melt profile make contact;

cooling the bell connection thus formed;

removing the bell connection and gasket from the mandrel[.];

whereby a pre-stressed and pre-located integral gasket is provided within the socket end of a polyethylene pipe which is securely retained within a receiving groove which is integrally formed about the gasket during the manufacturing step.

5. (Once amended) A method of manufacturing an integral gasket and bell connection for a joint of [thermoplastic] polyethylene pipe, the method comprising the steps of:

providing a rotatably driven mandrel having a substantially cylindrical end section corresponding to the internal diameter of a bell connection to be formed, the mandrel having an outer extent and an inner extent, the mandrel having a locating area for an elastomeric gasket on an external surface thereof;

positioning an elastomeric gasket on the external surface of the mandrel at the locating area thereof, the locating area being between the inner and outer extents of the mandrel;

forming a bell connection about the mandrel and suitably located gasket by extruding a melt profile made of [thermoplastic material] polyethylene onto the mandrel beginning adjacent the inner extent of the mandrel and spirally winding the melt profile around the cylindrical end section of the mandrel and around the gasket such that adjacent windings of the melt profile make contact;

terminating the extruding step while continuing to rotate the mandrel;

spraying cooling water over the bell end connection thus formed;

cutting a free end of the connection with a rotating knife;and

removing the bell end connection and integral gasket from the mandrel[.] ;

whereby a pre-stressed and pre-located integral gasket is provided within the socket end of a bell connection of a joint of polyethylene pipe which is securely retained within a receiving groove which is integrally formed about the gasket during the manufacturing step.

7. The method of claim 5, wherein the mandrel is heated to at least about 100 degrees C. before the melt profile is extruded.

8. The method of claim 5, further comprising the step of subjecting the extruded melt profile to a

weak mechanical loading by means of a rotating roll for intensifying a welding-together of the contacting melt profile windings.

9. (Once amended) The method of claim 5, wherein the rotating knife comprises a freely rotating circular blade which is pressed against the [thermoplastic material] polyethylene of the bell end connection for cutting the free end of the connection.

10. The method of claim 5, further comprising the steps of:

removing the bell connection from the mandrel by blowing pressurized air between the mandrel and the connection while directly pushing the connection in a direction opposite the mandrel.

11. The method of claim 10, further comprising the step of:

electrowelding the thus formed bell connection onto a generally cylindrical length of thermoplastic pipe.